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OTHER TRANSACTION AGREEMENT DTRS56-02-T-0001
SwRI® PROJECT 14.06162

"APPLICATION OF REMOTE-FIELD EDDY CURRENT (RFEC) TESTING TO INSPECTION OF UNPIGGABLE PIPELINES"

Many pipelines contain internal restrictions that do not allow the passage of inspection pigs that use conventional inspection technology. The purpose of this project is to investigate the feasibility of a remote-field eddy current (RFEC) inspection method that utilizes either a unique collapsible excitation coil or a small rigid excitation coil that can pass through internal pipeline restrictions.

Task 2, RFEC Coil Design, involves the modeling and design of RFEC coils to accommodate the size constraints imposed by internal restrictions. The primary probe configuration involves a full-size (12-inch diameter) collapsible, segmented excitation coil. Previously, a segmented coil was designed with a hinging mechanism that will allow it to fold in multiple configurations so that both plug valves and reduced diameter regions of pipe can be accommodated. The secondary configuration involves a rigid, reduced diameter excitation coil that is sufficiently small to pass through plug valves as well as reduced diameter areas. A 3.5-inch diameter rigid coil was designed for this configuration.

Task 3, Breadboard System, involves development of a laboratory breadboard RFEC system and preparation of a test specimen. A small-diameter rigid excitation coil was also fabricated and configured for testing with the breadboard system. An improved system was also designed for positioning and centering the coils and sensors within the test pipe and maintaining angular alignment of the inspection system as it travels through the pipe.

In Task 4, RFEC Evaluation, the RFEC breadboard system was evaluated on the 12-inch diameter test pipe with the full-size conventional rigid coil, the collapsible coil, and the small-diameter rigid coil. Comparable results from defects in the test pipe were obtained with the full-size rigid coil and the collapsible coil using the same number of ampere-turns. In order to obtain comparable results with the small-diameter coil, it was necessary to increase the number of ampere-turns by about a factor of 8.

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